

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 98/07728

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H02K3/40

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H02K H01F H01B B60M B60L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 036 165 A (ELTON RICHARD K ET AL) 30 July 1991 see column 2, line 27 - line 58; figure 1 ---	1-30
A	DE 40 22 476 A (THYSSEN INDUSTRIE ;KABELMETAL ELECTRO GMBH (DE)) 16 January 1992 see column 3, line 11 - column 4, line 33; figure 3 ---	1-30
A	FR 2 108 171 A (SUMITOMO ELECTRIC INDUSTRIES) 19 May 1972 see page 2, line 34 - line 38; figure 1 ---	1-30
A	GB 913 386 A (ALLMANNA SVENSKA ELECTRISKA AKTIENBOLAGET) 19 December 1962 see page 2, line 67 - line 91; figure 2 ---	1-30
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

28 April 1999

Date of mailing of the international search report

07/05/1999

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Tangocci, A

# INTERNATIONAL SEARCH REPORT

Inter national Application No  
PCT/EP 98/07728

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	WO 97 45847 A (ASEA BROWN BOVERI ;LEIJON MATS (SE)) 4 December 1997 see page 19, line 36 - page 21, line 2; figures 2,3 ----	1-30
A,P	WO 97 45929 A (ASEA BROWN BOVERI ;FROMM UDO (SE); LEIJON MATS (SE); MING LI (SE);) 4 December 1997 see page 11, line 27 - page 14, line 18; figure 5 ----	1-30
A	GB 2 071 433 A (PILLER GMBH CO KG ANTON) 16 September 1981 see figure 1 ----	1-30
A	PATENT ABSTRACTS OF JAPAN vol. 008, no. 185 (E-262), 24 August 1984 & JP 59 076167 A (TOSHIBA KK), 1 May 1984 see abstract -----	1-30

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Information on patent family members

International Application No

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US 5036165 A	30-07-1991	US 5067046 A	19-11-1991
		US 4853565 A	01-08-1989
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FR 2108171 A	19-05-1972	NONE	
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter. Application No

PCT/EP 98/07728

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9745847 A		CZ 9803879 A	17-02-1999
		CZ 9803881 A	17-03-1999
		CZ 9803882 A	17-02-1999
WO 9745929 A	04-12-1997	AU 2987397 A	05-01-1998
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		FR 2474781 A	31-07-1981

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Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

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EE	Estonia						

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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US 5036165 A	30-07-1991	US 5067046 A	19-11-1991
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DE 4022476 A	16-01-1992	NONE	
FR 2108171 A	19-05-1972	NONE	
✓ GB 913386 A		NONE	
✓ WO 9745847 A	04-12-1997	SE 508556 C	12-10-1998
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		CZ 9803868 A	17-02-1999

# INTERNATIONAL SEARCH REPORT

International Application No

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A	GB 2 071 433 A (PILLER GMBH CO KG ANTON) 16 September 1981 see figure 1 ---	1-30
A	✓ PATENT ABSTRACTS OF JAPAN vol. 008, no. 185 (E-262), 24 August 1984 & JP 59 076167 A (TOSHIBA KK), 1 May 1984 see abstract -----	1-30

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Form PCT/ISA/210 (patent family annex) (July 1992)

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International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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## PCT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

NEWBY, Martin, John  
J.Y. & G.W. Johnson  
Kingsbourne House  
229-231 High Holborn  
London WC1V 7DP  
ROYAUME-UNI

Date of mailing (day/month/year) 26 July 1999 (26.07.99)	<b>IMPORTANT NOTIFICATION</b>
Applicant's or agent's file reference KN8371-S.WBH	
International application No. PCT/EP98/07728	International filing date (day/month/year) 30 November 1998 (30.11.98)

1. The following indications appeared on record concerning:

☒ the applicant
                 
 ☐ the inventor
                 
 ☐ the agent
                 
 ☐ the common representative

Name and Address ASEA BROWN BOVERI AB S-721 78 Västerås Sweden	State of Nationality SE	State of Residence SE
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person
                 
 ☐ the name
                 
 ☒ the address
                 
 ☐ the nationality
                 
 ☐ the residence

Name and Address ASEA BROWN BOVERI AB S-721 83 Västerås Sweden	State of Nationality SE	State of Residence SE
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

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<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

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## PATENT COOPERATION TREATY

## PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
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From the INTERNATIONAL BUREAU

To:

NEWBY, Martin, John  
J.Y. & G.W. Johnson  
Kingsbourne House  
229-231 High Holborn  
London WC1V 7DP  
ROYAUME-UNI

Date of mailing (day/month/year) 06 October 1999 (06.10.99)	<b>IMPORTANT NOTIFICATION</b>
Applicant's or agent's file reference KN8371-S.WBH	
International application No. PCT/EP98/07728	International filing date (day/month/year) 30 November 1998 (30.11.98)

## 1. The following indications appeared on record concerning:

☒ the applicant
                 
 ☐ the inventor
                 
 ☐ the agent
                 
 ☐ the common representative

Name and Address ASEA BROWN BOVERI AB S-721 83 Västerås Sweden	State of Nationality SE	State of Residence SE
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

## 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person
                 
 ☒ the name
                 
 ☐ the address
                 
 ☐ the nationality
                 
 ☐ the residence

Name and Address ABB AB S-721 83 Västerås Sweden	State of Nationality SE	State of Residence SE
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	Facsimile No.	
	Teleprinter No.	

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Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

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Crystal Plaza 2  
Washington, DC 20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year)

07 July 1999 (07.07.99)

International application No.

PCT/EP98/07728

Applicant's or agent's file reference

KN8371-S.WBH

International filing date (day/month/year)

30 November 1998 (30.11.98)

Priority date (day/month/year)

28 November 1997 (28.11.97)

Applicant

LEIJON, Mats et al

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

11 June 1999 (11.06.99)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

F. Baechler

Telephone No.: (41-22) 338.83.38

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>KN8371-S.WBH</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/EP 98/ 07728</b>	International filing date (day/month/year) <b>30/11/1998</b>	(Earliest) Priority Date (day/month/year) <b>28/11/1997</b>
Applicant <b>ASEA BROWN BOVERI AB et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

2

☐ None of the figures.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 98/07728

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H02K3/40

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H02K H01F H01B B60M B60L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 036 165 A (ELTON RICHARD K ET AL) 30 July 1991 see column 2, line 27 - line 58; figure 1 ----	1-30
A	DE 40 22 476 A (THYSSEN INDUSTRIE ;KABELMETAL ELECTRO GMBH (DE)) 16 January 1992 see column 3, line 11 - column 4, line 33; figure 3 ----	1-30
A	FR 2 108 171 A (SUMITOMO ELECTRIC INDUSTRIES) 19 May 1972 see page 2, line 34 - line 38; figure 1 ----	1-30
A	GB 913 386 A (ALLMANNA SVENSKA ELECTRISKA AKTIENBOLAGET) 19 December 1962 see page 2, line 67 - line 91; figure 2 ----- -/-	1-30



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

28 April 1999

Date of mailing of the international search report

07/05/1999

Name and mailing address of the ISA

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Authorized officer

Tangocci, A



# INTERNATIONAL SEARCH REPORT

International Application No

PCI/EP 98/07728

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	WO 97 45847 A (ASEA BROWN BOVERI ;LEIJON MATS (SE)) 4 December 1997 see page 19, line 36 - page 21, line 2; figures 2,3 ---	1-30
A,P	WO 97 45929 A (ASEA BROWN BOVERI ;FROMM UDO (SE); LEIJON MATS (SE); MING LI (SE);) 4 December 1997 see page 11, line 27 - page 14, line 18; figure 5 ---	1-30
A	GB 2 071 433 A (PILLER GMBH CO KG ANTON) 16 September 1981 see figure 1 ---	1-30
A	PATENT ABSTRACTS OF JAPAN vol. 008, no. 185 (E-262), 24 August 1984 & JP 59 076167 A (TOSHIBA KK), 1 May 1984 see abstract -----	1-30

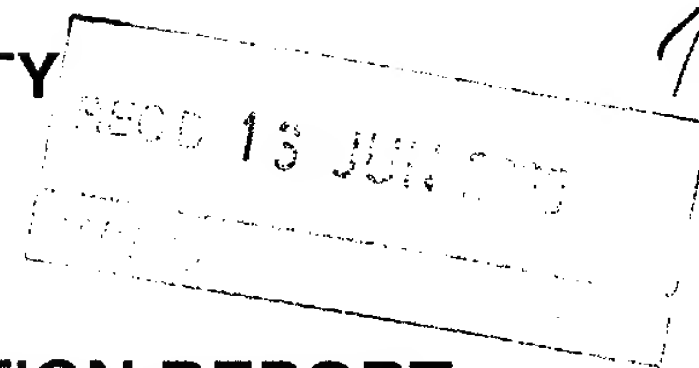


PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference KN8371-S.WBH		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP98/07728	International filing date (day/month/year) 30/11/1998	Priority date (day/month/year) 28/11/1997	
International Patent Classification (IPC) or national classification and IPC H02K3/40			
Applicant ABB AB			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 11/06/1999	Date of completion of this report 08.05.00
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Tangocci, A Telephone No. +49 89 2399 2686 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP98/07728

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-22 as originally filed

**Claims, No.:**

1-30 as originally filed

**Drawings, sheets:**

1/12-12/12 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP98/07728

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	1-30
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-30
Industrial applicability (IA)	Yes:	Claims	1-30
	No:	Claims	

**2. Citations and explanations**

**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**V. Reasoned statement**

1. The present application contains eight independent claims, each directed to an electricity supply system for traction, said supply systems being known per se as acknowledged by the applicant (and disclosed in the preambles of said independent claims), said independent claims being all characterized by the same features concerning the insulation of the windings of the transformers or rotating converters included in said electricity supply systems.

The present application does not satisfy the criterion set forth in Article 33(3) PCT because the subject-matter of independent claims 1, 2, 6, 9, 11 and 17-19 does not involve an inventive step (Rule 65(1) (2) PCT).

2. Document US,A,5036165 (=D1) discloses the winding of a dynamo-electric machine, the insulation of said winding consisting of two semiconducting layers, each layer providing a substantially equipotential surface, and solid insulation between said semiconducting layers.

The subject-matter of claims 1, 2, 6, 9, 11 and 17-19 differs therefrom in that said winding is employed in transformers or rotating converters included in electricity supply systems such as the supply systems illustrated at the left-hand sides of figures 3-7, at the right-hand sides of figure 8, and at figures 9 and 13 of the present application, which are typical supply systems of the prior art as specifically stated by the applicant, see lines 30-34 of page 14, lines 14-16 of page 18, lines 14-16 of page 19, and lines 17-20 of page 21 of the present application.

It would be obvious for the person skilled in the art, namely when the same result is to be achieved, to employ such a known winding according to the above-mentioned document D1 in transformers or rotation converters of the known electricity supply systems of the above-mentioned figures, thereby arriving at the supply systems of claims 1, 2, 6, 9, 11 and 17-19.

The subject-matter of claims 1, 2, 6, 9, 11 and 17-19 does therefore not involve an inventive step (Article 33(3) PCT).

3. Documents DE,A,4022476 (=D2), FR,A,2108171 (=D3) and GB,A,913386 (=D4)

disclose each substantially the same features as D1.

Therefore also on the grounds of the teachings of D2-D4 claims 1,2, 6, 9, 11 and 17-19 do not involve an inventive step, for the same reasons as see par. 2 hereabove.

4. The subject-matter of dependent claims 3,-5, 7, 8, 10, 12-16 and 20-30 does not appear to involve an inventive step in combination with the subject-matter of the claim to which it is appended, for the details disclosed in these claims are either already known or appear to be of the nature of workshop variations of details readily envisaged by persons skilled in the art. See also the documents cited in the search report.

The subject-matter of claims 3,-5, 7, 8, 10, 12-16 and 20-30 therefore does not involve an inventive step (Article 33 (3) PCT).

**VII. Certain defects in the application**

1. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2 (b) PCT).

**VIII. Certain observations on clarity**

1. The application contains eight independent claims of the same category, giving rise to the objection that the claims **as a whole** are not clear and concise as required by Article 6 PCT.